CITY OF ALBUQUERQUE

July 24, 2006

Steve J. Salazar, P.E.
Wilson & Company, Inc.
2600 American Rd SE, Ste 100
Rio Rancho, NM 87124

Re: Santa Fe ~~III~~ 4 at the Trails Unit II Grading and Drainage Plan
Engineer's Stamp dated 7-12-06 (C9/D1~~B~~) 1F

Dear Mr. Salazar,

Based upon the information provided in your submittal dated 7-13-06, the above referenced plan is approved for Preliminary Plat action and Site Development Plan for Subdivision Approval by the DRB.

However, the above referenced plan is not approved for Grading Permit until the following comment is addressed:

- Raising this site is creating a drop-off to the lot on the South (APS North West High School). Obtain permission from APS to change the grade of their property so that the grade of the APS property is a 3-1 taper up to this site or a grade acceptable to APS. Include a sign-off block on the plan.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Curtis A. Cherne, E.I.
Engineering Associate, Planning Dept.
Development and Building Services
B1B

C: file
Brad Bingham

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

DRAINAGE REPORT

for

TRACT 9A AT THE TRAILS UNIT II
Albuquerque, New Mexico

JULY 2006

I, Steve J. Salazar, do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

Steve J. Salazar, P.E.
NM No. 16241

7/12/06
Date

STEVE J. SALAZAR
NEW MEXICO
16241
LICENSED PROFESSIONAL ENGINEER

C09/D001F

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Introduction

Wilson & Company prepared this drainage report under contract to Longford Homes. The document provides a basis for the design of storm water conveyance systems within Tract 9A of the Trails Unit II (subject property). The objective of this report is to analyze the hydrologic characteristics associated with the existing and developed conditions.

Tract 9A of the Trails Unit II is a single-family residential subdivision with 114 total lots within The Trails master planned community. The "Master Drainage Study for The Trails Subdivision", dated December 2003, prepared by Bohannan-Huston, Inc (BHI Study) outlines the major drainage requirements for the entire Trails development. This DMP covers a large area surrounding the subject property. The master planned area will drain through a series of detention surge ponds to the southeast corner of the Trails project to reduce flows. As established in the "Amendment to The Trails Subdivision Master Drainage Study", dated May 5, 2004 and prepared by Wilson & Company, a future storm drain system (currently under design, COA#761281) is scheduled to carry developed flows from the southeast corner of the Trails south to the Boca Negra Detention Dam. Wilson & Company has revised the BHI Study as the project progresses to more accurately model the drainage conditions. This revised Drainage Master Plan is included in this report as Plate 2 (also referred to as the Overall Pond Grading & Drainage Plan for Future Developed Conditions). The Drainage Master Plan establishes revised Basin, Pond and Hydrologic summary data. Tract 9A of The Trails Unit II drains to the South-Easement storm drain system of The Trails Unit II COA # 730084, which ultimately drains to the Universe Blvd. storm drain system to the Boca Negra dam scheduled to be built with Trails Unit II COA # 761281 as outlined in the BHI Drainage Master Plan.

Project Description

The proposed development is located within the city limits of Albuquerque, New Mexico. The subject property consists of approximately 17.34 acres of undeveloped land on the west side of Albuquerque, south of Ventana Ranch subdivision. The Trails Subdivision is located on Albuquerque's Northwest Mesa, west of Universe Boulevard and south of Paseo Del Norte. The subject property is bound by Tract 8 at The Trails Unit II to the east, Tract 9A at the Trails to the west, Town of Alameda Grant to the south, and Tract 6 at the Trails Unit II to the north. See Exhibit A, Vicinity Map.

There are currently seven other tracts within the Trails Subdivision that are developed or under construction - Santa Fe at the Trails (Tract C of the Trails), Taos at the Trails (Tract D of the Trails), Heritage at the Trails Units I and II (Tract A & B of the Trails respectively), The Reserve at the Trails (Tract F of the Trails), and Santa Fe at the Trails Unit II (Tract 6 of the Trails Unit II) and Valle Vista at The Trails Unit II (Tract 11 of Trails Unit II). The Trails Unit II (COA #730084) is also currently under construction, which includes the development of Woodmont Avenue, Oakridge Street, Rainbow

Boulevard, Paseo Del Norte and Universe Boulevard within the boundaries of The Trails Unit II. Also included is the construction of all major drainage facilities necessary for the development of The Trails Unit II, including facilities within Tract 9A.

The current legal description of the proposed development is "Tract 9A of the Trails Unit II (Filed in Book 2004C, Page 332, on 10/18/2004). The site is located on Zone Atlas Sheet C-9-Z. See Exhibit C for site location on this Zone Atlas Sheet. Tract 9A of Trails Unit II is currently zoned R-D. No portion of Tract 9A lies within the 100-year flood zone based on FIRM Map #35001C0111D dated September 20, 1996. See Exhibit B for site location on the Flood Insurance Rate Map.

Existing Conditions

Tract 9A of Trails Unit II consists of approximately 17.34 acres of undeveloped land on the west side of Albuquerque, south of Ventana Ranch subdivision. Currently, the site is located in a local depression with slopes ranging from 2% to 5% and is covered with native grasses, scrub brush, and exposed basaltic ridges. The soils are classified as Alemeda Sandy Loam (AmB) for slopes based on sheet 10 of Soil survey of Bernalillo County. See Exhibit D for site location on the Soils map. A shallow basaltic layer runs subsurface of the natural grade, and varies in depth from 0 ft to 9 ft.

Developed Conditions

(Refer to Plates 1 & 2 – Interim and Developed Conditions)

The developed site will consist of 114 lots of single-family housing. Tract 9A of Trails Unit II is contained within Basins L of the Drainage Master Plan. Proposed flows for individual sub-basins are determined based on an area percentage of the overall Basin L flow. The overall Basin L has an area of 27.03 acres and a fully developed 100-year flow of 78.21 cfs. This plan develops 64.33% (17.39 acres) of the total 27.03acres. The total generated runoff for Tract 9A under fully developed conditions is 50.31cfs.

This report divides the proposed development into sub-basins. (See the proposed Basin Map in Plate 4). Drainage & basin boundaries were determined based on the grades established in the grading & drainage plan, and by street flow capacity and storm drain requirements. (See the Grading & Drainage Plans in Plate 3 and Street Flow Capacity Calculations in Appendix C).

Proposed flows from Sub-Basins 1 through 3 are collected through a series of inlets on Road B. See the proposed Sub-Basin Map in Plate 4. (See the HydraFlow Storm Drain Calculations and Inlet Capacity Calculations in Appendix D).

See Plate 1, Overall Pond Grading & Drainage Plan - Interim Conditions for summary tables. See Appendix A for AHYMO input and output.

In the future developed conditions, all ponds will be detention surge ponds. According to the "Amendment to the Trails Subdivision Master Drainage Study", a maximum of flowrate of 200 cfs is allowed from the Trails Subdivision. According to the revised Drainage Master Plan, a maximum flowrate of 198 cfs will enter the Universe Blvd. storm drain system to the Boca Negra Dam. See Plate 2 for the Overall Pond Grading & Drainage Plan for Developed Conditions.

Once the storm drain from The Trails to the Boca Negra Detention Dam is completed, all of the plugs in the ponds within The Trails Unit II can be removed, creating detention facilities and eliminating the need to retain runoff from the Trails.

The hydrologic analysis for the interim and developed condition was completed using the Arid Lands Hydrologic Model (AHYMO) Version 1997.02. The 100-year 24-hour return frequency storm was used as the basis of analysis. (See Appendices A & B for input and output data). Methodology outlined in Section 22.2 of the City of Albuquerque Development Process Manual was also incorporated into this analysis. Street flows have been evaluated using Flow Master by Haested Methods. Street flows were analyzed for the use of roll type curb where capacities permitted. Inlets are located to prevent exceeding the street flow capacities per the DPM. See Appendix C for street capacity analysis. Storm Drain design and analysis was performed using *Hydraflow*. See Appendix D for *Hydraflow* output.

Grading Plan

The Tract 9A of Trails Unit II Grading Plan is attached as Plate 3. It illustrates the overall grading concept for the Tract 9A of Trails Unit 2 as well as the proposed storm drain.

Conclusion

The analysis performed for this report demonstrates that the proposed system of streets and storm drainage improvements will safely convey and adequately detain the 100-year storm runoff from the offsite and the onsite basins contributing to the site development. Wilson & Company recommends that the proposed storm drain system undergo regular maintenance activities. This should include removing debris from grate inlets, as well as removing sediment buildup within the pipe system. The Future area contributing flow to the Tract 9A storm drainage system should be analyzed in greater detail at the time of development to ensure that the runoff is within the constraints of this design.

Per The Trails Unit II Construction Plans, plugs at Pond E, Pond G and Pond K are scheduled to be installed. As a result of the interim conditions analysis, Wilson & Company recommends also installing temporary plugs at Pond D and Pond F to retain runoff from the 100-year, 10-day event, until the Universe storm drain to the Boca Negra Detention Dam is constructed.

```
   AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                          - VERSION:  1997.02c      RUN DATE
(MON/DAY/YR) =06/13/2006
   INPUT FILE = TRAILS.WPD                                                                   USER NO.=
AHYMO-C-9803c01UNMLIB-AH

                                         FROM   TO                   PEAK       RUNOFF                 TIME TO
CFS       PAGE =   1
                             HYDROGRAPH    ID   ID          AREA    DISCHARGE    VOLUME      RUNOFF      PEAK
PER
   COMMAND         IDENTIFICATION     NO.  NO.       (SQ MI)       (CFS)      (AC-FT)    (INCHES)   (HOURS)
ACRE      NOTATION

   *S THE TRAILS OVERALL DRAINAGE - INTERIM CONDITIONS
   *SUMMARY              1 MID. B. PIEDRAS- DEV CONDS WITH BULK - MODIFIED 7/95
   START
   TIME=       .00
   RAINFALL  TYPE= 2
   RAIN24=   2.660
   SEDIMENT BULK
   PK BF =    1.00
   *S*
   *S*****************************************************************************
   *S****************************************************************************
   *S************** COMPUTE ONSITE BASINS FROM THE TRAILS SUBDIVISION*************
   COMPUTE NM HYD        OFFSITE1    -    50      .19980       38.48      4.588      .43051     2.050
.301 PER IMP=    .00
   *S BASIN A IS CURRENTLY 0% DEVELOPED
   COMPUTE NM HYD         BASIN.A    -    20      .10480       86.57      2.406      .43051     1.500
1.291 PER IMP=    .00
   *S BASIN D IS CURRENTLY 73% DEVELOPED
   COMPUTE NM HYD         BASIN.D    -    25      .09110      122.40      6.205     1.27718     1.550
2.099 PER IMP=  36.50
   *S BASIN C IS CURRENTLY 0% DEVELOPED
   COMPUTE NM HYD         BASIN.C    -    20      .02110       17.06       .484      .43051     1.500
1.263 PER IMP=    .00
   *S BASIN F IS CURRENTLY 55% DEVELOPED
   COMPUTE NM HYD         BASIN.F    -    20      .12960      196.82      7.347     1.06295     1.500
2.373 PER IMP=  27.50
   *S WITH TRACT 6 IMPROVEMENTS, BASIN G IS CURRENTLY 100% DEVELOPED
   COMPUTE NM HYD         BASIN.G    -    20      .04990      105.96      4.292     1.61257     1.500
3.318 PER IMP=  50.00
   COMPUTE NM HYD        OFFSITE2    -    55      .08050       14.42      1.848      .43051     2.050
.280 PER IMP=    .00
   *S BASIN B IS CURRENTLY 0% DEVELOPED
   COMPUTE NM HYD         BASIN.B    -    30      .03910       31.61       .898      .43051     1.500
1.263 PER IMP=    .00
   *S BASIN E IS CURRENTLY 22% DEVELOPED
   COMPUTE NM HYD         BASIN.E    -    30      .12060      132.88      4.377      .68044     1.500
```

```
1.722 PER IMP=  11.00
    *S BASIN H IS CURRENTLY 16% DEVELOPED
    COMPUTE NM HYD       BASIN.H   -    20        .03110        28.24       1.015       .61193    1.550
1.419 PER IMP=   8.00
    *S BASIN L IS CURRENTLY 4% DEVELOPED
    COMPUTE NM HYD       BASIN.L   -    20        .02770        19.34        .703       .47583    1.550
1.091 PER IMP=   2.00
    *S BASIN J IS CURRENTLY 15% DEVELOPED
    COMPUTE NM HYD       BASIN.J   -    80        .05140        34.57       1.647       .60067    1.600
1.051 PER IMP=   7.50
    ROUTE RESERVOIR       POND.J   80   90        .05140         9.86       1.647       .60066    2.050
.300 AC-FT=     .863
    *S BASIN K IS CURRENTLY 14% DEVELOPED
    COMPUTE NM HYD       BASIN.K   -    85        .07050        55.37       2.215       .58923    1.550
1.227 PER IMP=   7.00
    *S*************************************************************************
    *S****RUNOFF FROM THE TRAILS IS CONVEYED TO THE BOCA NEGRA DETENTION FACILITY
    *S****VIA UNIVERSE SD PER "AMENDMENT TO THE TRAILS SUBDIVISION MASTER DRAINAGE S
    *S****DATED MAY 5, 2004 BY WILSON & CO.
    *S*************************************************************************
    *S****END OF THE TRAILS DRAINAGE ANALYSIS
    FINISH
```

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	Inserted Line	182.8	60 c	350.0	5390.35	5397.70	2.100	5394.41	5401.47	0.31	5401.47	End
2	Inserted Line	182.8	60 c	350.0	5397.80	5398.85	0.300	5402.80*	5404.53*	0.20	5404.73	1
3	Inserted Line	182.8	60 c	350.0	5398.95	5400.00	0.300	5404.73*	5406.45*	1.15	5407.60	2
4	Inserted Line	103.8	54 c	186.1	5400.10	5403.10	1.612	5408.28*	5408.80*	0.42	5409.22	3
5		78.17	54 c	312.4	5403.20	5404.14	0.301	5409.51*	5410.00*	0.06	5410.06	4
6	Inserted Line	78.17	54 c	256.0	5404.24	5405.01	0.301	5410.06*	5410.46*	0.15	5410.61	5
7		48.94	54 c	256.0	5405.11	5405.88	0.301	5410.84*	5411.00*	0.02	5411.02	6
8		48.94	54 c	256.0	5405.98	5406.75	0.301	5411.02	5411.17	0.02	5411.19	7
9		48.94	54 c	256.0	5406.85	5407.62	0.301	5411.35	5411.47	0.07	5411.54	8
10		18.78	48 c	282.9	5407.72	5408.58	0.304	5411.72	5411.75	0.01	5411.76	9
11		18.78	36 c	250.9	5408.68	5409.45	0.307	5411.76	5411.93	0.06	5411.99	10
12		13.30	30 c	320.3	5409.55	5410.32	0.240	5412.05	5412.35	0.02	5412.37	11
13		13.30	48 c	396.0	5410.42	5411.23	0.205	5414.42	5414.45	0.00	5414.45	12
14		13.30	36 c	194.7	5411.33	5413.71	1.222	5414.45	5414.87	n/a	5414.87 j	13
15		79.00	48 c	338.8	5400.10	5402.07	0.581	5408.33*	5409.36*	0.61	5409.97	3
16	(2)	79.00	42 c	89.5	5402.17	5404.86	3.006	5409.97*	5410.52*	1.05	5411.57	15
17	(2)	5.48	18 c	14.3	5416.18	5416.47	2.024	5417.68	5417.67	0.20	5417.87	11
18		2.74	18 c	23.4	5416.47	5416.94	2.009	5418.00	5417.99	0.07	5418.06	17
19		30.16	24 c	18.5	5415.39	5415.85	2.486	5417.39	5417.72	1.52	5417.72	9
20		15.08	24 c	23.4	5415.85	5416.44	2.523	5418.88*	5418.98*	0.36	5419.34	19
21		16.40	18 c	23.5	5413.42	5414.01	2.508	5414.92	5415.51	1.34	5416.85	6
22		8.20	18 c	23.4	5414.01	5414.59	2.481	5417.85*	5418.00*	0.33	5418.33	21

Project File: SD-SOUTH-EASEMENT-052606.stm | Number of lines: 22 | Run Date: 06-01-2006

NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.

Bohannan Huston

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87109-4335

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June 22, 2011

Curtis Cherne, P. E.
Planning Department
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Tierra Vista Units 1 and 2 at the Trails, south of Woodmont and east of Pond H, Grading and Drainage Plan (C9/D001F)

Dear Curtis:

This letter provides a written response to your comments dated June 13, 2011:

- *Will Unit 2 be graded at the same time as Unit 1? If so, please state on the grading plan.* **No, the Unit 1 grading plan has been revise to eliminate the Unit 2 grading. A tie slope along the east side of Unit 1 has been added. See revised grading plan dated 6/22/11.**
- *From the as-builts provided; it appears that the 54 inch storm drain from Pond H was not connected to the storm drain in Universe Blvd.* **Longford Homes is researching this issue.**
- *From the grades provided, it appears a retaining wall is required along the entire southern boundary of Unit 1 and Unit 2.* **The grading plan has been adjusted reducing the amount of retaining wall along the southern boundary. Retaining walls are shown where the split is greater than 2'. At the east end of Unit 2, there is a proposed 2' split on the wall at the property, along with tie grading on the adjacent property. See the attached approval from APS that allows grading on their property.**
- *It appears the exterior property line was omitted from Unit 2.* **Property line has been added. See the revised grading plan dated 6/21/11.**
- *Will grading be required east of Unit 2 lots 14 through 23 and 64?* **A tie slope along the east side of Unit 2 has been added. See the revised grading plan dated 6/22/11.**
- *Should a small pond be built for the bypass of the inlets on the east side of Unti 2?* **A pond has been included at the east end of Tempe Avenue. See the revised grading plan dated 6/22/11.**

- *Per our discussion on 5-17-11, some rear yards were allowed to drain out the back with a specific detail. Please show on plan.* **The grading plan has been adjusted, resulting in fewer lots needing to drain out the back. For those lots with a split between right-of-way and rear yard less than 2', they drain to the front. A split greater than 2' requires rear yard drainage. This keeps the maximum wall height below 8', assuming a 6' garden wall. There are only 2 lots in Unit 2 requiring rear yard drainage based on the above criteria. A detail has been added to the details sheet. See the revised grading plan dated 6/22/11.**
- *Please include street names on the Grading Plan.* **The street names have been added. See the revised grading plan dated 6/22/11.**

Infrastructure List

- *Pond K improvements should be added.* **Pond K has been added to both Unit 1 and 2. See revised infrastructure lists.**
- *Add a Note to the Infrastructure List "Certification of the Grading and Drainage Plan is required for release of Financial Guarantees".* **Note has been added to both Unit 1 and 2. See revised infrastructure lists.**

If you have any questions or require further information in order to approve the Grading and Drainage Plan, please feel free to contact me at 823-1000.

Sincerely,

Scott J. Steffen, P.E.
Vice President
Community Development and Planning Group

Enclosures

Current DRC Project No. ______________

Date Submitted: June 22, 2011
Date Site Plan for Bldg Permit Approv ______
Date Site Plan for Sub. Approved: ______
Date Preliminary Plat Approved: ______
Date Preliminary Plat Expires: ______
DRB Project No. ______

Figure 12

INFRASTRUCTURE LIST

EXHIBIT 'A'
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

TIERRA VISTA UNIT 2 AT THE TRAILS UNIT 2
(REPLAT OF TRACT 9A AT THE TRAILS UNIT 2)

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PAVING							
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TOMBSTONE ROAD	TERMINUS OF TOMBSTONE ROAD, UNIT 1	GLOBE STREET	/	/	/
		22' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TOMBSTONE ROAD (NARROW STREET FOR TRAFFIC CALMING)	MIDBLOCK BETWEEN KINGMAN STREET	PEORIA STREET	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES	PEORIA STREET	WOODMONT AVENUE	TOMBSTONE ROAD	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TEMPE AVENUE	TERMINUS OF TEMPE AVENUE, UNIT 1	EAST PROPERTY LINE	/	/	/
		22' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TEMPE AVENUE (NARROW STREET FOR TRAFFIC CALMING)	MIDBLOCK BETWEEN KINGMAN STREET	GLOBE STREET	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	GLOBE STREET	TOMBSTONE ROAD	TEMPE AVENUE	/	/	/
		24' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON ONE SIDE*	GLOBE STREET	TOMBSTONE ROAD	STUB STREET (END)	/	/	/
		* SIDEWALKS TO BE BUILT/DEFERRED IN ACCORDANCE W/APPROVED SIDEWALK EXHIBIT							
		PUBLIC STORM DRAIN IMPROVEMENTS							
		18" - 30" DIA	RCP W/ MH & INLETS	TEMPE AVENUE	VARIOUS LOCATIONS IN TEMPE AVENUE	TIE TO EXISTING 54" STORM DRAIN IN TEMPE AVENUE (COA 730084)	/	/	/
		9.9 ac-ft	PERMANENT DETENTION POND W/AGREEMENT AND COVENANT (POND K)	DRAINAGE EASEMENT NO. 2005127389 (BK-A102 PF 7018)	EAST SIDE OF UNIVERSE BLVD		/	/	/

NOTE: CERTIFICATION OF THE GRADING AND DRAINAGE PLAN IS REQUIRED FOR RELEASE OF FINANCIAL GUARANTEES

something for bypass

3 M+

10' west ~~west to~~

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PUBLIC WATERLINE IMPROVEMENTS							
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TOMBSTONE ROAD	WEST BOUNDARY	GLOBE STREET	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	GLOBE STREET	TOMBSTONE ROAD	TIE TO EXISTING WATER LINE IN TEMPE AVENUE (COA 730084)	/	/	/
		4" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	GLOBE STREET	TOMBSTONE ROAD	NORTH END OF GLOBE STREET	/	/	/
		PUBLIC SANITARY SEWER IMPROVEMENTS							
		EX 8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TEMPE AVENUE	BUILT UNDER COA 730084		/	/	/
		EX 8" DIA	REMOVE SANITARY SEWER & MH BUILT UNDER COA 730084	LOTS 30 & 36	TOMBSTONE ROAD	TEMPE AVENUE	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TOMBSTONE ROAD	LOT 1	GLOBE STREET	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	GLOBE STREET	LOT 13	TIE TO EXISTING SANITARY SEWER MH IN TEMPE AVENUE (COA 730084)	/	/	/

AGENT/OWNER	DEVELOPMENT REVIEW BOARD MEMBER APPROVALS			
SCOTT STEFFEN, PE 6/22/2011 PREPARED BY: PRINT NAME DATE	DRB CHAIR	DATE	PARKS & GENERAL SERVICES	DATE
BOHANNAN HUSTON, INC. FIRM	TRANSPORTATION DEVELOPMENT	DATE	AMAFCA	DATE
SIGNATURE	ABCWUA	DATE	CITY ENGINEER	DATE
MAXIMUM TIME ALLOWED TO CONSTRUCT IMPROVEMENTS WITHOUT A DRB EXTENSION				DATE

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT	AGENT/OWNER

```
*                  PROJECT NAME:  TIERRA VISTA (TRACT 9A) AT THE TRAILS UNIT II
*                  DATE:  JUNE 21, 2011
*                  INPUT FILE NAME:  AHYMO.HYM
*                  OUTUPUT FILE NAME:  AHYMO.OUT
*                  PROJECT NUMBER:  20110369
*                  DESIGN STORM:   100 YEAR-24 HOUR STORM
*
*////////////////////////////////////////////////////////////////////////*
START                TIME=0.0 HR PUNCH CODE=0
**************************************************************************
*  ZONE 1, 100 YEAR RAINFALL TABLE
**************************************************************************
RAINFALL                TYPE=1  RAIN QUARTER=0.0
                        RAIN ONE=1.87 IN  RAIN SIX=2.20 IN
                        RAIN DAY=2.66 IN  DT=0.05 HRS
**************************************************************************
*   BASIN CALCULATIONS
**************************************************************************

*******************BASIN ONE (1)*******************
COMPUTE NM HYD          ID=1  HYD=2  AREA=0.009301SQ MI
                        PER A=0  PER B=19.5  PER C=19.5  PER D=61
                        TP=0.1715 HR  MASS RAIN=-1
PRINT HYD               ID=1     CODE=1
*
*******************BASIN TWO (2)*******************
COMPUTE NM HYD          ID=2  HYD=3  AREA=0.003801SQ MI
                        PER A=0  PER B=19.5  PER C=19.5  PER D=61
                        TP=0.1715 HR  MASS RAIN=-1
PRINT HYD               ID=1     CODE=1
*
*******************BASIN THREE (3)*******************
COMPUTE NM HYD          ID=3  HYD=4  AREA=0.002944SQ MI
                        PER A=0  PER B=19.5  PER C=19.5  PER D=61
                        TP=0.1715 HR  MASS RAIN=-1
PRINT HYD               ID=1     CODE=1
*
*******************BASIN FOUR (4)*******************
COMPUTE NM HYD          ID=4  HYD=5  AREA=0.011175SQ MI
                        PER A=0  PER B=19.5  PER C=19.5  PER D=61
                        TP=0.1715 HR  MASS RAIN=-1
PRINT HYD               ID=1     CODE=1
*
FINISH
CO
```

TIERRA VISTA UNITS 1 AND 2

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =06/21/2011
INPUT FILE = AHYMO.HYM USER NO.= AHYMO-S-9702c1BohanHu-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
COMPUTE NM HYD	2.00	-	1	.00930	18.67	.753	1.51825	1.550	3.136	PER IMP= 61.00
COMPUTE NM HYD	3.00	-	2	.00380	7.64	.308	1.51825	1.550	3.141	PER IMP= 61.00
COMPUTE NM HYD	4.00	-	3	.00294	5.92	.238	1.51825	1.550	3.143	PER IMP= 61.00
COMPUTE NM HYD	5.00	-	4	.01118	22.43	.905	1.51825	1.550	3.136	PER IMP= 61.00
FINISH										

$\frac{11.4}{22.43} = 0.5 \sim \frac{1}{2}$

$V \sim \frac{1}{2} \cdot .9 = .45$ ac-ft

Roll - 0.5%.txt

MANNING'S N = 0.017 SLOPE = 0.005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.5	4.0	10.5	0.1	7.0	37.5	0.0
2.0	7.9	0.3	5.0	23.5	0.4	8.0	39.1	0.3
3.0	9.5	0.0	6.0	36.5	0.1	9.0	47.0	0.5

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.008	0.003	0.647	0.330	0.639	0.027
0.050	0.050	0.032	0.017	1.294	0.524	1.277	0.054
0.075	0.075	0.072	0.049	1.940	0.687	1.916	0.082
0.100	0.100	0.128	0.106	2.587	0.832	2.554	0.111
0.125	0.125	0.200	0.193	3.234	0.965	3.193	0.139
0.150	0.150	0.306	0.268	5.724	0.877	5.676	0.162
0.175	0.175	0.485	0.438	8.674	0.903	8.621	0.188
0.200	0.200	0.737	0.724	11.624	0.983	11.565	0.215
0.225	0.225	1.063	1.147	14.574	1.079	14.510	0.243
0.250	0.250	1.462	1.726	17.524	1.180	17.454	0.272
0.275	0.275	1.935	2.483	20.474	1.283	20.399	0.301
0.300	0.300	2.482	3.436	23.424	1.384	23.343	0.330
0.325	0.325	3.103	4.604	26.374	1.484	26.288	0.359
0.350	0.350	3.814	5.820	31.102	1.526	31.013	0.386
0.375	0.375	4.653	7.389	35.733	1.588	35.644	0.414
0.400	0.400	5.575	9.552	38.202	1.713	38.113	0.446
0.425	0.425	6.559	12.010	40.671	1.831	40.581	0.477
0.450	0.450	7.604	14.776	43.141	1.943	43.050	0.509
0.475	0.475	8.711	17.857	45.610	2.050	45.519	0.540

STREET CAPACITY

- WHEN STREET FLOW EXCEEDS 4.6 cfs

TRANSITION FROM ROLL CURB TO STANDARD CURB

Std - 0.5%.txt

MANNING'S N = 0.017 SLOPE = 0.005

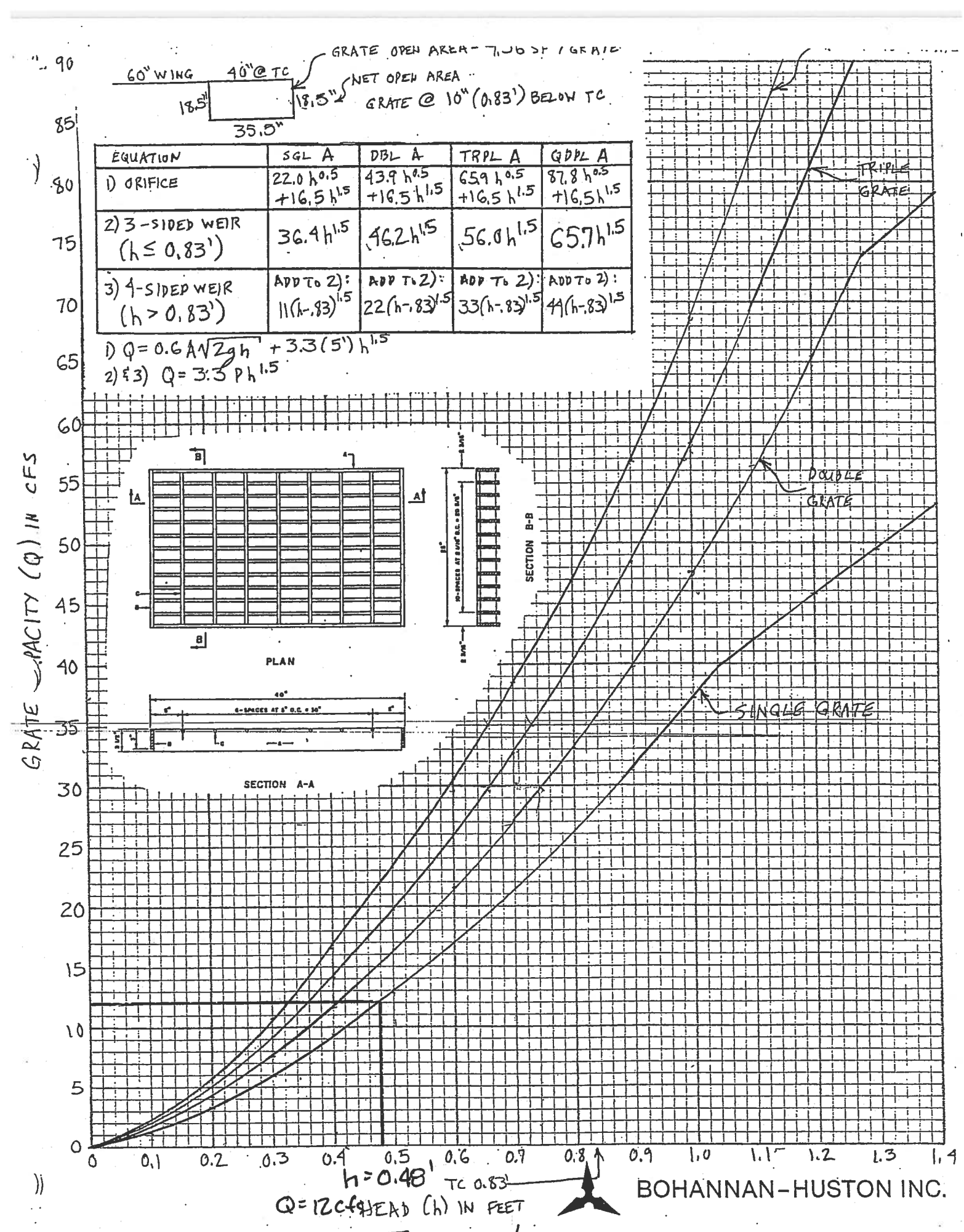
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	11.5	0.1	9.0	37.7	0.7
2.0	8.9	0.7	6.0	23.5	0.4	10.0	38.1	0.7
3.0	9.3	0.7	7.0	35.5	0.1	11.0	47.0	0.9
4.0	9.5	0.0	8.0	37.5	0.0			

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.010	0.003	0.822	0.322	1.702	0.027
0.050	0.050	0.039	0.020	1.645	0.511	2.484	0.054
0.075	0.075	0.088	0.059	2.467	0.670	3.266	0.082
0.100	0.100	0.156	0.127	3.290	0.811	4.048	0.110
0.125	0.125	0.244	0.230	4.112	0.941	4.830	0.139
0.150	0.150	0.366	0.338	6.318	0.925	6.996	0.163
0.175	0.175	0.549	0.531	8.870	0.967	9.509	0.190
0.200	0.200	0.795	0.832	11.423	1.046	12.021	0.217
0.225	0.225	1.104	1.257	13.975	1.138	14.534	0.245
0.250	0.250	1.476	1.823	16.527	1.235	17.047	0.274
0.275	0.275	1.910	2.546	19.079	1.333	19.560	0.303
0.300	0.300	2.408	3.444	21.631	1.430	22.072	0.332
0.325	0.325	2.968	4.531	24.183	1.526	24.585	0.361
0.350	0.350	3.591	5.822	26.735	1.621	27.098	0.391
0.375	0.375	4.276	7.412	28.787	1.734	29.110	0.422
0.400	0.400	4.981	9.547	28.839	1.917	29.123	0.457
0.425	0.425	5.686	11.891	28.890	2.091	29.136	0.493
0.450	0.450	6.391	14.433	28.942	2.258	29.148	0.529
0.475	0.475	7.097	17.166	28.993	2.419	29.161	0.566
0.500	0.500	7.803	20.082	29.045	2.574	29.174	0.603
0.525	0.525	8.510	23.176	29.097	2.723	29.186	0.640
0.550	0.550	9.217	26.441	29.148	2.869	29.199	0.678
0.575	0.575	9.924	29.873	29.200	3.010	29.212	0.716
0.600	0.600	10.631	33.466	29.251	3.148	29.224	0.754
0.625	0.625	11.339	37.217	29.303	3.282	29.237	0.793
0.650	0.650	12.047	41.123	29.354	3.413	29.250	0.831
0.675	0.675	12.757	44.698	29.889	3.504	29.753	0.866
0.700	0.700	13.536	45.935	33.273	3.394	32.217	0.879
0.725	0.725	14.372	48.400	35.737	3.368	34.681	0.901
0.750	0.750	15.270	51.215	38.202	3.354	37.144	0.925
0.775	0.775	16.229	54.376	40.666	3.350	39.608	0.950
0.800	0.800	17.250	57.881	43.131	3.355	42.072	0.975
0.825	0.825	18.333	61.731	45.595	3.367	44.536	1.001

STREET CAPACITY

TOMBSTONE AVE (@ KINGMAN ST)

- BASIN 1 FLOW = 18.7 cfs < 41.1 cfs CAPACITY ∴ OK
- FLOW DEPTH @ 18.7 cfs = 0.48'
- INLET CAPACITY = 12 cfs
- 2 INLETS @ 12 cfs = 24 cfs > 18.7 cfs ∴ OK
- FLOW DEPTH @ 2x100-YR = 0.64'
  - 2 SINGLE 'A' INLETS HAVE CAPACITY TO PASS 2x 100-YR FLOW



BOHANNAN-HUSTON INC.

PROJECT NAME Tierra Vista SHEET ____ OF ____

PROJECT NO. Tombstone Ave @ Kingman BY JPK DATE 4/9/92

Std - 0.5%.txt

MANNING'S N = 0.017 SLOPE = 0.005

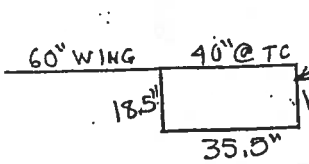
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	11.5	0.1	9.0	37.7	0.7
2.0	8.9	0.7	6.0	23.5	0.4	10.0	38.1	0.7
3.0	9.3	0.7	7.0	35.5	0.1	11.0	47.0	0.9
4.0	9.5	0.0	8.0	37.5	0.0			

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.010	0.003	0.822	0.322	1.702	0.027
0.050	0.050	0.039	0.020	1.645	0.511	2.484	0.054
0.075	0.075	0.088	0.059	2.467	0.670	3.266	0.082
0.100	0.100	0.156	0.127	3.290	0.811	4.048	0.110
0.125	0.125	0.244	0.230	4.112	0.941	4.830	0.139
0.150	0.150	0.366	0.338	6.318	0.925	6.996	0.163
0.175	0.175	0.549	0.531	8.870	0.967	9.509	0.190
0.200	0.200	0.795	0.832	11.423	1.046	12.021	0.217
0.225	0.225	1.104	1.257	13.975	1.138	14.534	0.245
0.250	0.250	1.476	1.823	16.527	1.235	17.047	0.274
0.275	0.275	1.910	2.546	19.079	1.333	19.560	0.303
0.300	0.300	2.408	3.444	21.631	1.430	22.072	0.332
0.325	0.325	2.968	4.531	24.183	1.526	24.585	0.361
0.350	0.350	3.591	5.822	26.735	1.621	27.098	0.391
0.375	0.375	4.276	7.412	28.787	1.734	29.110	0.422
0.400	0.400	4.981	9.547	28.839	1.917	29.123	0.457
0.425	0.425	5.686	11.891	28.890	2.091	29.136	0.493
0.450	0.450	6.391	14.433	28.942	2.258	29.148	0.529
0.475	0.475	7.097	17.166	28.993	2.419	29.161	0.566
0.500	0.500	7.803	20.082	29.045	2.574	29.174	0.603
0.525	0.525	8.510	23.176	29.097	2.723	29.186	0.640
0.550	0.550	9.217	26.441	29.148	2.869	29.199	0.678
0.575	0.575	9.924	29.873	29.200	3.010	29.212	0.716
0.600	0.600	10.631	33.466	29.251	3.148	29.224	0.754
0.625	0.625	11.339	37.217	29.303	3.282	29.237	0.793
0.650	0.650	12.047	41.123	29.354	3.413	29.250	0.831
0.675	0.675	12.757	44.698	29.889	3.504	29.753	0.866
0.700	0.700	13.536	45.935	33.273	3.394	32.217	0.879
0.725	0.725	14.372	48.400	35.737	3.368	34.681	0.901
0.750	0.750	15.270	51.215	38.202	3.354	37.144	0.925
0.775	0.775	16.229	54.376	40.666	3.350	39.608	0.950
0.800	0.800	17.250	57.881	43.131	3.355	42.072	0.975
0.825	0.825	18.333	61.731	45.595	3.367	44.536	1.001

STREET CAPACITY

TEMPE AVE (WEST END)

- BASIN 2 FLOW = 7.6 cfs < 41.1 cfs CAPACITY ∴ OK
- FLOW DEPTH @ 7.6 cfs = 0.38'
- INLET CAPACITY = 8.4 cfs
- 2 INLETS @ 8.4 cfs = 16.8 cfs > 7.6 cfs ∴ OK
- INLETS (SINGLE A) HAVE 2x 100-YR FLOW CAPACITY



GRATE OPEN AREA = 7.06 SF / GRATE

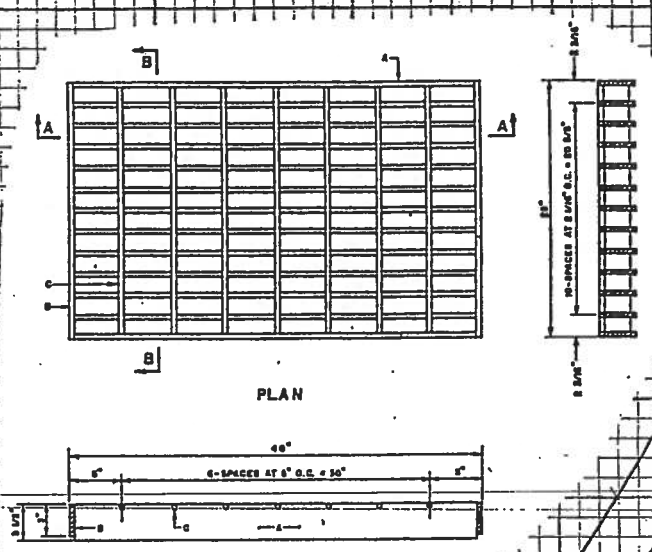
NET OPEN AREA

GRATE @ 10" (0.83') BELOW TC

EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0\,h^{0.5} + 16.5\,h^{1.5}$	$43.9\,h^{0.5} + 16.5\,h^{1.5}$	$65.9\,h^{0.5} + 16.5\,h^{1.5}$	$87.8\,h^{0.5} + 16.5\,h^{1.5}$
2) 3-SIDED WEIR ($h \le 0.83'$)	$36.4\,h^{1.5}$	$46.2\,h^{1.5}$	$56.0\,h^{1.5}$	$65.7\,h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-.83)^{1.5}$	ADD TO 2): $22(h-.83)^{1.5}$	ADD TO 2): $33(h-.83)^{1.5}$	ADD TO 2): $44(h-.83)^{1.5}$

1) $Q = 0.6A\sqrt{2gh} + 3.3(5')h^{1.5}$

2) & 3) $Q = 3.3\,Ph^{1.5}$



GRATE CAPACITY (Q) IN CFS

TRIPLE GRATE

DOUBLE GRATE

SINGLE GRATE

h = .38

TC 0.83'

Q = 8.4 cfs

HEAD (h) IN FEET

BOHANNAN-HUSTON INC.

PROJECT NAME TIERRA VISTA SHEET ____ OF ____

PROJECT NO. TEMPE AVE WEST END BY JPK DATE 4/9/92

SUBJECT RATING CURVE FOR TYPE A INLETS CHKD DATE

MANNING'S N = 0.017 SLOPE = 0.005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	11.5	0.1	9.0	37.7	0.7
2.0	8.9	0.7	6.0	23.5	0.4	10.0	38.1	0.7
3.0	9.3	0.7	7.0	35.5	0.1	11.0	47.0	0.9
4.0	9.5	0.0	8.0	37.5	0.0			

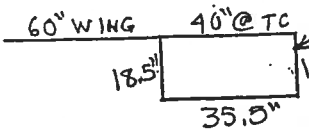
WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.010	0.003	0.822	0.322	1.702	0.027
0.050	0.050	0.039	0.020	1.645	0.511	2.484	0.054
0.075	0.075	0.088	0.059	2.467	0.670	3.266	0.082
0.100	0.100	0.156	0.127	3.290	0.811	4.048	0.110
0.125	0.125	0.244	0.230	4.112	0.941	4.830	0.139
0.150	0.150	0.366	0.338	6.318	0.925	6.996	0.163
0.175	0.175	0.549	0.531	8.870	0.967	9.509	0.190
0.200	0.200	0.795	0.832	11.423	1.046	12.021	0.217
0.225	0.225	1.104	1.257	13.975	1.138	14.534	0.245
0.250	0.250	1.476	1.823	16.527	1.235	17.047	0.274
0.275	0.275	1.910	2.546	19.079	1.333	19.560	0.303
0.300	0.300	2.408	3.444	21.631	1.430	22.072	0.332
0.325	0.325	2.968	4.531	24.183	1.526	24.585	0.361
0.350	0.350	3.591	5.822	26.735	1.621	27.098	0.391
0.375	0.375	4.276	7.412	28.787	1.734	29.110	0.422
0.400	0.400	4.981	9.547	28.839	1.917	29.123	0.457
0.425	0.425	5.686	11.891	28.890	2.091	29.136	0.493
0.450	0.450	6.391	14.433	28.942	2.258	29.148	0.529
0.475	0.475	7.097	17.166	28.993	2.419	29.161	0.566
0.500	0.500	7.803	20.082	29.045	2.574	29.174	0.603
0.525	0.525	8.510	23.176	29.097	2.723	29.186	0.640
0.550	0.550	9.217	26.441	29.148	2.869	29.199	0.678
0.575	0.575	9.924	29.873	29.200	3.010	29.212	0.716
0.600	0.600	10.631	33.466	29.251	3.148	29.224	0.754
0.625	0.625	11.339	37.217	29.303	3.282	29.237	0.793
0.650	0.650	12.047	41.123	29.354	3.413	29.250	0.831
0.675	0.675	12.757	44.698	29.889	3.504	29.753	0.866
0.700	0.700	13.536	45.935	33.273	3.394	32.217	0.879
0.725	0.725	14.372	48.400	35.737	3.368	34.681	0.901
0.750	0.750	15.270	51.215	38.202	3.354	37.144	0.925
0.775	0.775	16.229	54.376	40.666	3.350	39.608	0.950
0.800	0.800	17.250	57.881	43.131	3.355	42.072	0.975
0.825	0.825	18.333	61.731	45.595	3.367	44.536	1.001

STREET CAPACITY

TEMPE AVE (MIDDLE INLETS EAST OF KINGMAN)

- BASIN 3 FLOW = 5.9 cfs < 41.1 cfs CAPACITY ∴ OK
- FLOW DEPTH @ 5.9 cfs = 0.35'
- INLET CAPACITY = 7.2 cfs
- 2 INLETS @ 7.2 cfs = 14.4 cfs > 5.9 cfs ∴ OK
- INLETS (SINGLE A) HAVE 2x 100-YR FLOW CAPACITY

GRATE OPEN AREA = 7.06 SF / GRATE



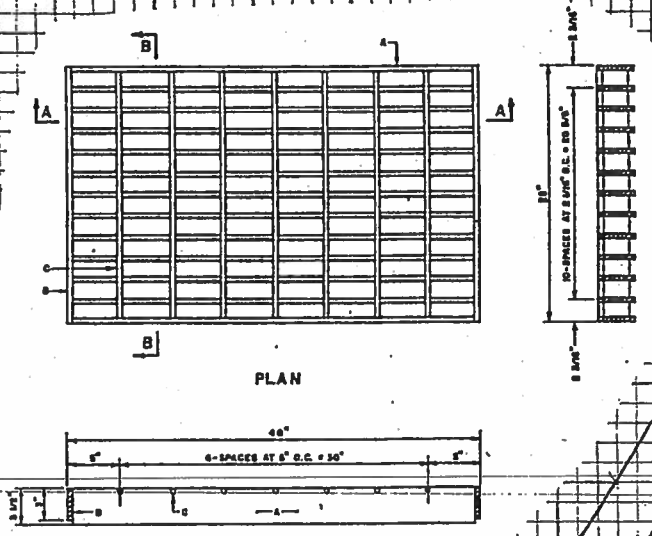
NET OPEN AREA

GRATE @ 10" (0.83') BELOW TC

EQUATION	SGL A	DBL A	TRPL A	QDPL A
1) ORIFICE	$22.0\,h^{0.5} + 16.5\,h^{1.5}$	$43.9\,h^{0.5} + 16.5\,h^{1.5}$	$65.9\,h^{0.5} + 16.5\,h^{1.5}$	$87.8\,h^{0.5} + 16.5\,h^{1.5}$
2) 3-SIDED WEIR ($h \le 0.83'$)	$36.4\,h^{1.5}$	$76.2\,h^{1.5}$	$116.0\,h^{1.5}$	$157\,h^{1.5}$
3) 4-SIDED WEIR ($h > 0.83'$)	ADD TO 2): $11(h-.83)^{1.5}$	ADD TO 2): $22(h-.83)^{1.5}$	ADD TO 2): $33(h-.83)^{1.5}$	ADD TO 2): $44(h-.83)^{1.5}$

1) $Q = 0.6\,A\sqrt{2gh} + 3.3(5')\,h^{1.5}$

2) & 3) $Q = 3.3\,P\,h^{1.5}$



GRATE CAPACITY (Q) IN CFS

TRIPLE GRATE

DOUBLE GRATE

SINGLE GRATE

h=0.35'

Q=7.2 cfs

TC 0.83'

HEAD (h) IN FEET

BOHANNAN-HUSTON INC.

PROJECT NAME TIERRA VISTA SHEET ____ OF ____

PROJECT NO. TEMPE AVE INLETS EAST OF KINGMAN BY JPK DATE 4/9/92

SUBJECT RATING CURVE FOR TYPE R INLETS CH'D ____ DATE ____

MANNING'S N = 0.017 SLOPE = 0.005

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	11.5	0.1	9.0	37.7	0.7
2.0	8.9	0.7	6.0	23.5	0.4	10.0	38.1	0.7
3.0	9.3	0.7	7.0	35.5	0.1	11.0	47.0	0.9
4.0	9.5	0.0	8.0	37.5	0.0			

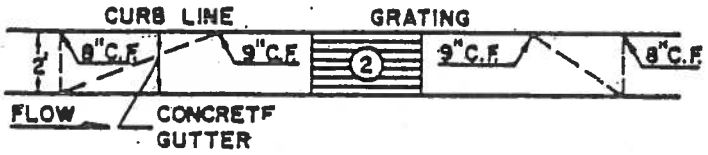
WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.025	0.025	0.010	0.003	0.822	0.322	1.702	0.027
0.050	0.050	0.039	0.020	1.645	0.511	2.484	0.054
0.075	0.075	0.088	0.059	2.467	0.670	3.266	0.082
0.100	0.100	0.156	0.127	3.290	0.811	4.048	0.110
0.125	0.125	0.244	0.230	4.112	0.941	4.830	0.139
0.150	0.150	0.366	0.338	6.318	0.925	6.996	0.163
0.175	0.175	0.549	0.531	8.870	0.967	9.509	0.190
0.200	0.200	0.795	0.832	11.423	1.046	12.021	0.217
0.225	0.225	1.104	1.257	13.975	1.138	14.534	0.245
0.250	0.250	1.476	1.823	16.527	1.235	17.047	0.274
0.275	0.275	1.910	2.546	19.079	1.333	19.560	0.303
0.300	0.300	2.408	3.444	21.631	1.430	22.072	0.332
0.325	0.325	2.968	4.531	24.183	1.526	24.585	0.361
0.350	0.350	3.591	5.822	26.735	1.621	27.098	0.391
0.375	0.375	4.276	7.412	28.787	1.734	29.110	0.422
0.400	0.400	4.981	9.547	28.839	1.917	29.123	0.457
0.425	0.425	5.686	11.891	28.890	2.091	29.136	0.493
0.450	0.450	6.391	14.433	28.942	2.258	29.148	0.529
0.475	0.475	7.097	17.166	28.993	2.419	29.161	0.566
0.500	0.500	7.803	20.082	29.045	2.574	29.174	0.603
0.525	0.525	8.510	23.176	29.097	2.723	29.186	0.640
0.550	0.550	9.217	26.441	29.148	2.869	29.199	0.678
0.575	0.575	9.924	29.873	29.200	3.010	29.212	0.716
0.600	0.600	10.631	33.466	29.251	3.148	29.224	0.754
0.625	0.625	11.339	37.217	29.303	3.282	29.237	0.793
0.650	0.650	12.047	41.123	29.354	3.413	29.250	0.831
0.675	0.675	12.757	44.698	29.889	3.504	29.753	0.866
0.700	0.700	13.536	45.935	33.273	3.394	32.217	0.879
0.725	0.725	14.372	48.400	35.737	3.368	34.681	0.901
0.750	0.750	15.270	51.215	38.202	3.354	37.144	0.925
0.775	0.775	16.229	54.376	40.666	3.350	39.608	0.950
0.800	0.800	17.250	57.881	43.131	3.355	42.072	0.975
0.825	0.825	18.333	61.731	45.595	3.367	44.536	1.001

STREET CAPACITY

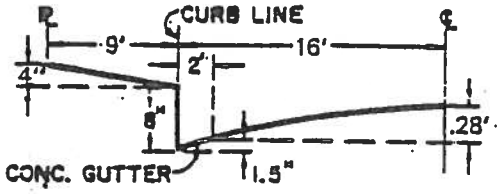
TEMPE AVE (EAST END)

- BASIN 4 FLOW = 22.4 cfs < 41.1 cfs CAPACITY ∴ OK
- FLOW DEPTH @ 22.4 cfs = 0.51'
- INLET CAPACITY = 5.5 cfs (SEE NOMOGRAPH)
- 2 INLETS @ 5.5 cfs = 11 cfs
- BY-PASS FLOW = 11.4 cfs

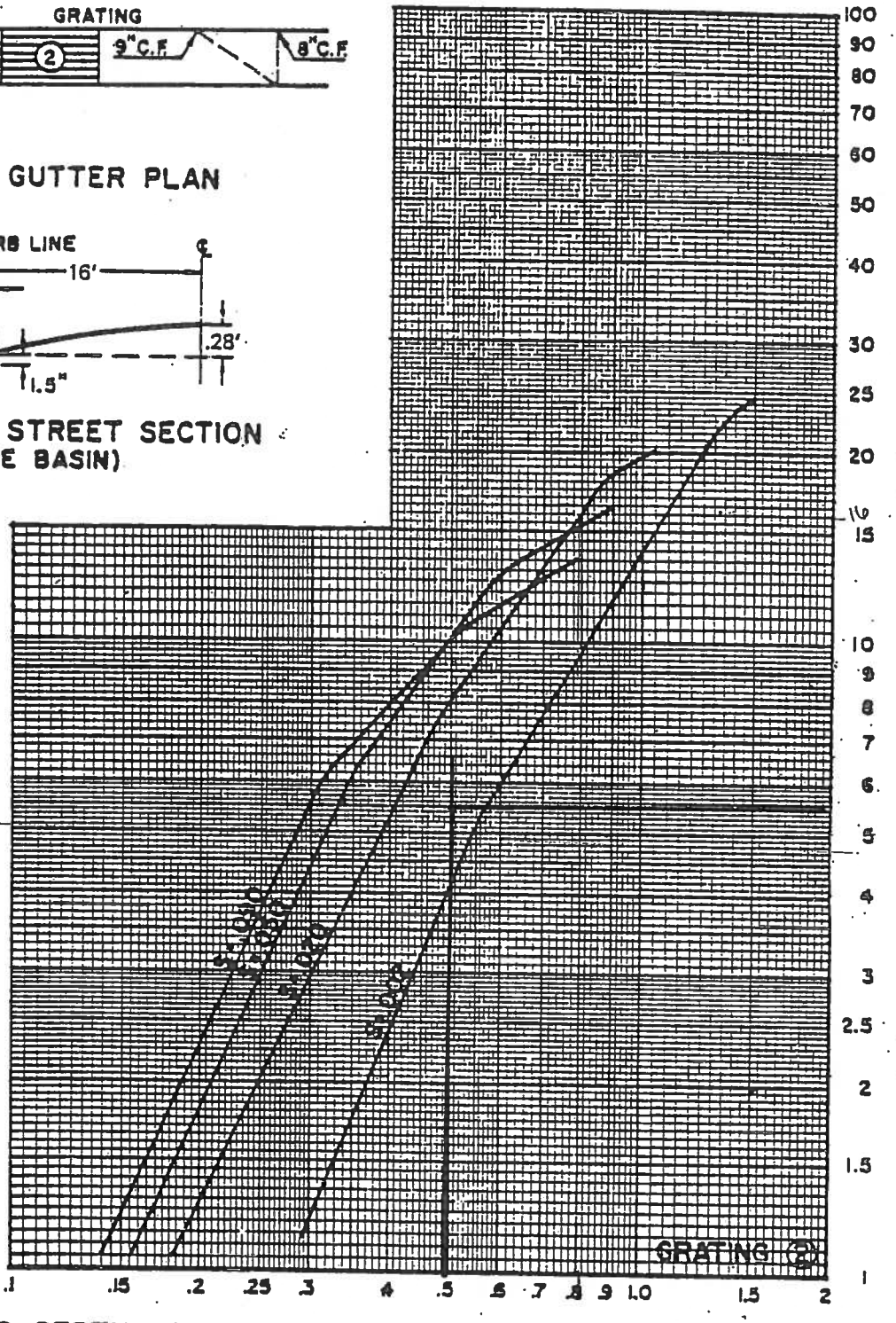
GRATING CAPACITIES FOR TYPE "A" , "C" and "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



TEMPE AVE (EAST END)

- D = 0.51'
- Q = 5.5 cfs

Current DRC
Project No. _____

Date Submitted: June 22, 2011
Date Site Plan for Bldg Permit Approv _____
Date Site Plan for Sub. Approved: _____

Date Preliminary Plat Approved: _____

Date Preliminary Plat Expires: _____

DRB Project No. _____

Figure 12

INFRASTRUCTURE LIST

EXHIBIT 'A'
TO SUBDIVISION IMPROVEMENTS AGREEMENT
DEVELOPMENT REVIEW BOARD (D.R.B.) REQUIRED INFRASTRUCTURE LIST

TIERRA VISTA UNIT 1 AT THE TRAILS UNIT 2
(REPLAT OF TRACT 9A AT THE TRAILS UNIT 2)

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This Listing is not necessarily a complete listing. During the SIA process and/or in the review of the construction drawings, if the DRC Chair determines that appurtenant items and/or unforeseen items have not been included in the infrastructure listing, the DRC Chair may include those items in the listing and related financial guarantee. Likewise, if the DRC Chair determines that appurtenant or non-essential items can be deleted from the listing, those items may be deleted as well as the related portions of the financial guarantees. All such revisions require approval by the DRC Chair, the User Department and agent/owner. If such approvals are obtained, these revisions to the listing will be incorporated administratively. In addition, any unforeseen items which arise during construction which which are necessary to complete the project and which normally are the Subdivider's responsibility will be required as a condition of project acceptance and close out by the City.

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PAVING							
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES	INDIAN HILLS STREET	WOODMONT AVENUE	TEMPE AVENUE	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TOMBSTONE ROAD	INDIAN HILLS STREET	APPROX. 125 LF EAST OF KINGMAN STREET	/	/	/
		22' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TOMBSTONE ROAD (NARROW STREET FOR TRAFFIC CALMING)	MIDBLOCK BETWEEN INDIAN HILLS STREET	KINGMAN STREET	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TEMPE AVENUE	INDIAN HILLS STREET	APPROX. 125 LF EAST OF KINGMAN STREET	/	/	/
		22' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES*	TEMPE AVENUE (NARROW STREET FOR TRAFFIC CALMING)	MIDBLOCK BETWEEN INDIAN HILLS STREET	KINGMAN STREET	/	/	/
		28' F-F	RESIDENTIAL PAVING W/ PCC CURB & GUTTER, PCC 4' WIDE SIDEWALK ON BOTH SIDES	KINGMAN STREET	TOMBSTONE ROAD	TEMPE AVENUE	/	/	/
		4'	PCC SIDEWALK	PEDESTRIAN ACCESS EASEMENT (TRACT A)	TEMPE AVENUE	RAINBOW BLVD	/	/	/
		* SIDEWALKS TO BE BUILT/DEFERRED IN ACCORDANCE W/APPROVED SIDEWALK EXHIBIT							
		PUBLIC STORM DRAIN IMPROVEMENTS							
		18" - 30" DIA	RCP W/ MH & INLETS	TEMPE AVENUE	VARIOUS LOCATIONS IN TEMPE AVENUE	TIE TO EXISTING 54" STORM DRAIN IN TEMPE AVENUE	/	/	/
		18" - 24" DIA	RCP W/ MH & INLETS	TOMBSTONE AVENUE	30' EAST OF KINGMAN STREET	KINGMAN STREET	/	/	/
		24" DIA	RCP W/ MH & INLETS	KINGMAN STREET	TOMBSTONE AVENUE	TEMPE AVENUE	/	/	/
		9.9 ac-ft	PERMANENT DETENTION POND W/AGREEMENT AND COVENANT (POND K)	DRAINAGE EASEMENT NO. 2005127389 (BK-A102 PF 7018)	EAST SIDE OF UNIVERSE BLVD	(COA 730084)	/	/	/

NOTE: CERTIFICATION OF THE GRADING AND DRAINAGE PLAN IS REQUIRED FOR RELEASE OF FINANCIAL GUARANTEES

SIA Sequence #	COA DRC Project #	Size	Type of Improvement	Location	From	To	Private Inspector	City Inspector	City Cnst Engineer
		PUBLIC WATERLINE IMPROVEMENTS							
		EX 12" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	INDIAN HILLS STREET	BUILT UNDER COA 730084		/	/	/
		EX 12" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TEMPE AVENUE	BUILT UNDER COA 730084		/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TOMBSTONE ROAD	INDIAN HILLS STREET	KINGMAN STREET	/	/	/
		6" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	TOMBSTONE ROAD	KINGMAN STREET	EAST BOUNDARY	/	/	/
		8" DIA	WATERLINE W/ NEC. VALVES FH'S, MJ'S & RJ'S	KINGMAN STREET	TEMPE AVENUE	TOMBSTONE ROAD	/	/	/
		PUBLIC SANITARY SEWER IMPROVEMENTS							
		EX 8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	INDIAN HILLS STREET	BUILT UNDER COA 730084		/	/	/
		EX 15" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TEMPE AVENUE	BUILT UNDER COA 730084		/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	TOMBSTONE ROAD	APPROX. 40 LF EAST OF INDIAN HILLS STREET	EAST BOUNDARY	/	/	/
		8" DIA	SANITARY SEWER W/ NEC. MH'S & SERVICES	KINGMAN STREET	TOMBSTONE ROAD	TIE TO EXISTING SANITARY SEWER IN TEMPE AVENUE	/	/	/

AGENT/OWNER	DEVELOPMENT REVIEW BOARD MEMBER APPROVALS			
SCOTT STEFFEN, PE 6/22/2011 PREPARED BY: PRINT NAME DATE	DRB CHAIR	DATE	PARKS & GENERAL SERVICES	DATE
BOHANNAN HUSTON, INC. FIRM:	TRANSPORTATION DEVELOPMENT	DATE	AMAFCA	DATE
SIGNATURE	ABCWUA	DATE	CITY ENGINEER	DATE
MAXIMUM TIME ALLOWED TO CONSTRUCT IMPROVEMENTS WITHOUT A DRB EXTENSION				DATE

DESIGN REVIEW COMMITTEE REVISIONS

REVISION	DATE	DRC CHAIR	USER DEPARTMENT	AGENT/OWNER

JEFF MORTENSEN + ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE ☐ NEW MEXICO 87109
ENGINEERS ☐ SURVEYORS (505) 345-4250
FAX: 505 345-4254 ☐ ESTABLISHED 1977

TRANSMITTAL

TO: Rick Beltramo
Longford Homes

7007 Jefferson NE, Suite A

DATE: May 8, 2006

PROJECT: APS Northwest High School

JMA JOB NO: 2005.180.3

xc: Bruce Stidworthy w/enclosure
Tyler Mason w/enclosure

VIA: ☑ Delivery ☐ Pickup ☐ US Mail ☐ Federal Express Delivery

WE ARE SENDING:

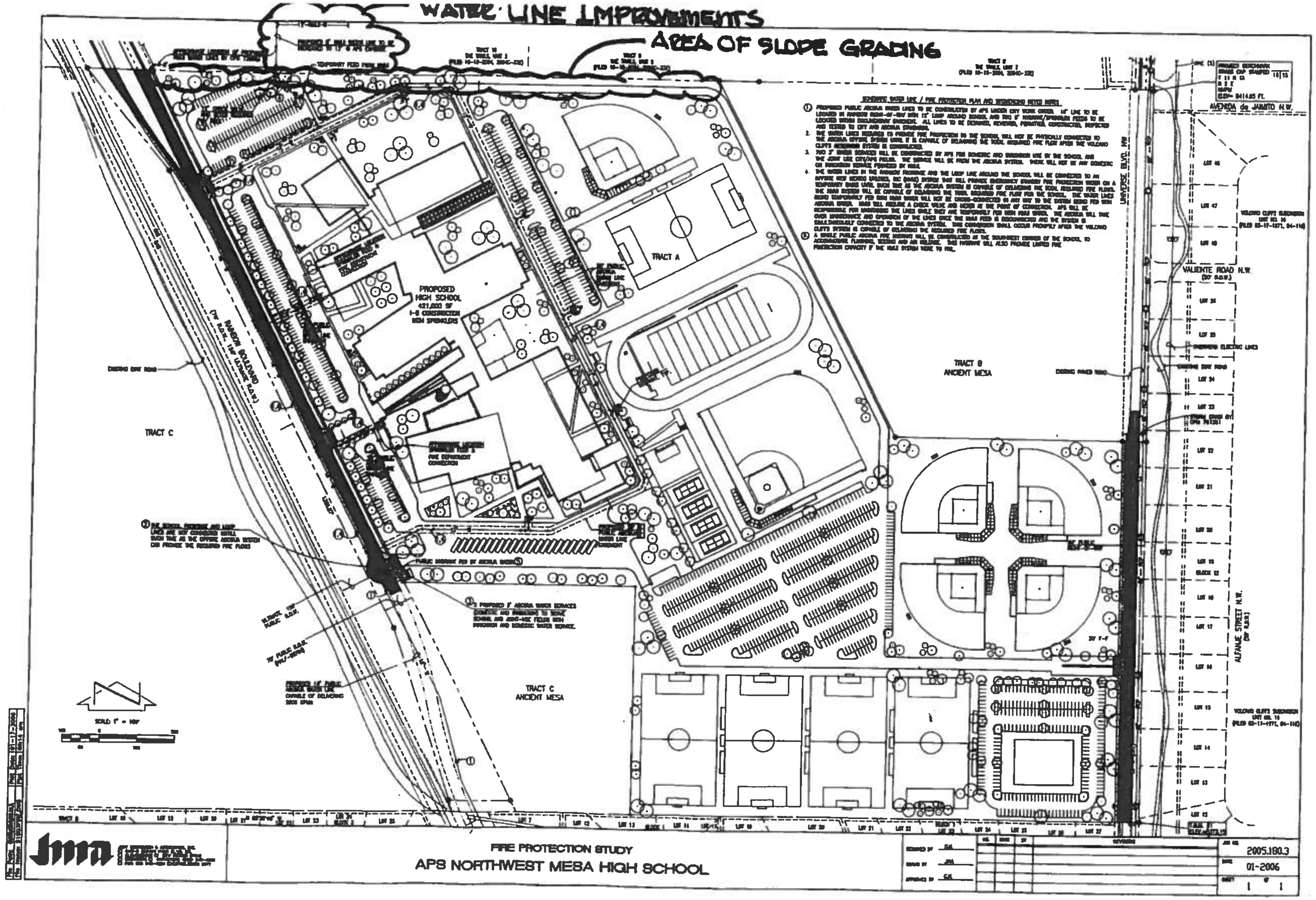
QTY.	DESCRIPTION	FOR
1	Signed Agreement	Your Use

REMARKS:

Here is the original agreement signed by APS. Please provide me with a copy of your revised water line plans as soon as possible so I can confirm my plans. Thanks for the help. Let me know if you have any questions or comments.

J. Graeme Means

LONGFORD HOMES NEW MEXICO
RECEIVED
MAY 0 8 2006


WATER LINE IMPROVEMENTS
AREA OF SLOPE GRADING
TRACT A
TRACT B
ANCIENT MESA
TRACT C
TRACT C
ANCIENT MESA
PROPOSED
HIGH SCHOOL
421,000 SF
I-B CONSTRUCTION
WITH SPRINKLERS
UNIVERSE BLVD. NW
AVENIDA de JAMITO N.W.
VALIENTE ROAD N.W.
ALFANJE STREET N.W.
RAINBOW BOULEVARD
FIRE PROTECTION STUDY
APS NORTHWEST MESA HIGH SCHOOL
2005.180.3
01-2006
1 of 1

LONGFORD HOMES

June 8, 2006

Brad Bingham
City Hydrologist
Hydrology Section Head
City of Albuquerque
600 2nd Street NW
Albuquerque, NM 87102

RE: Tract 10, The Trails Unit 2, Drainage Easement

Dear Brad,

Longford is under contract to sale Tract 10 of Unit 2, of The Trails. A drainage easement encumbers Tract 10 for a drainage pond located on Tract 9a. The buyers of Tract 10 have asked what the drainage easement means relative to their use of Tract 10 (see attached exhibit).

The pond located on Tract 9a includes the berm and access/maintenance road. The pond berm is elevated relative to Tract 10 and therefore a sloped-area from the top of the pond to the existing grade of Tract 10 is planned. The drainage easement is essentially a slope easement on Tract 10 for the pond on Tract 9a.

Due to the presence of basalt, the design concept of The Trails requires significant amounts of import/fill material to properly develop the property. It has been anticipated that once the fill is placed, the slope-area will no longer remain and the need for the easement will be eliminated. Should fill be placed in sufficient amount to eliminate the easement then, vacation of the easement should be allowed.

This letter is a request for your pre-approval of this process. Approval would be subject to submittal of a grading plan approved by the City. It is understood that the application must be made to the City Development Review Board (DRB) to process a) vacation approval and b) final plat in order to remove the easement. Please show your concurrence to the above by signing in the space provided.

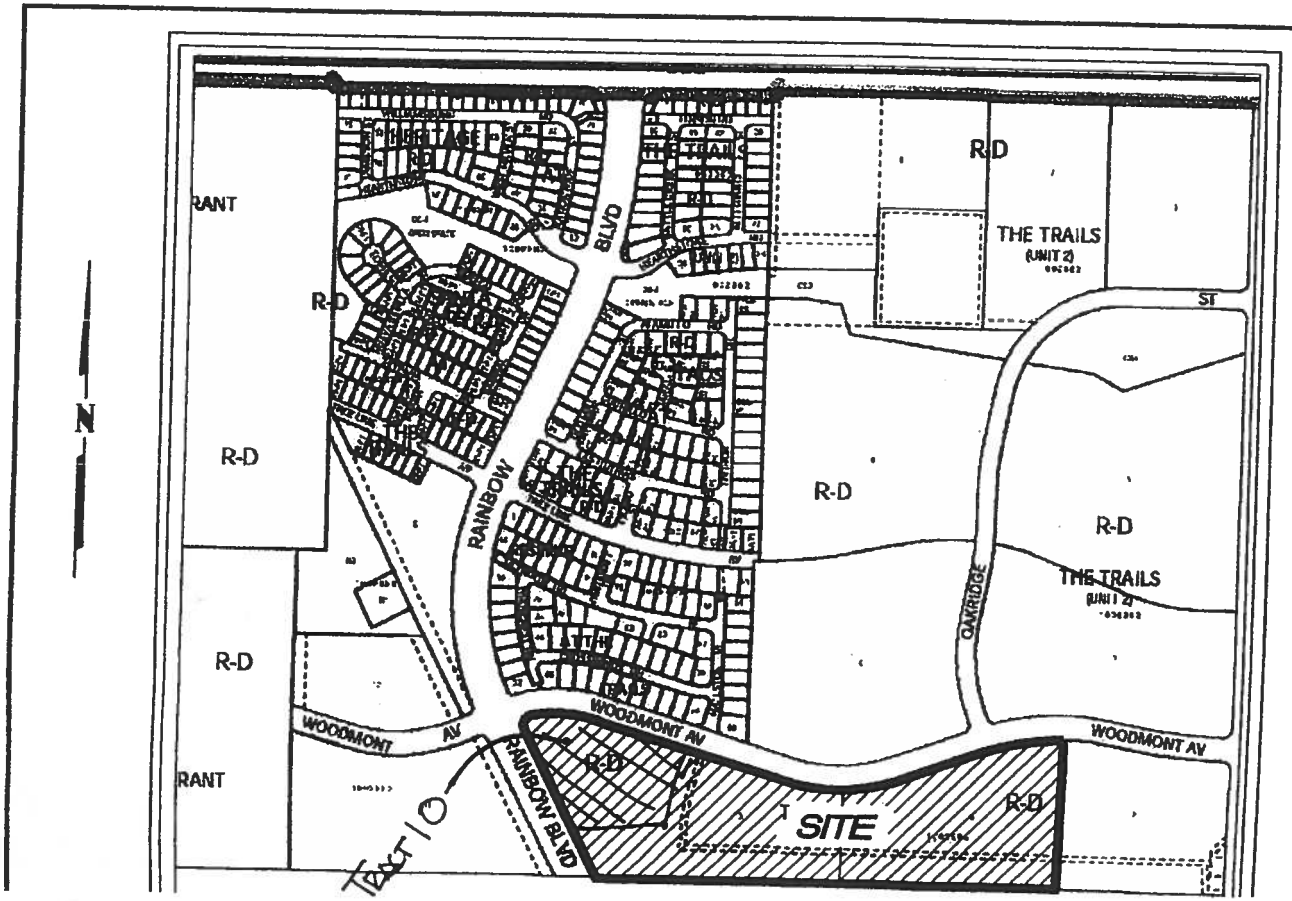
Rick Beltramo, P.E
Longford Homes

CONCURRANCE:

Brad Bingham, P.E
City Hydrologist
City of Albuquerque
6/19/06

Cc: Tracy Murphy

7007 Jefferson Street NE, Suite A • Albuquerque, New Mexico 87109 • Phone (505) 761-9911 • Fax (505) 761-9922
www.LONGFORDHOMES.com



TREASURERS C

This is to certify t
1009064303
1009064414
INDS DEVEL

Bernalillo County Tr

PUBLIC UT

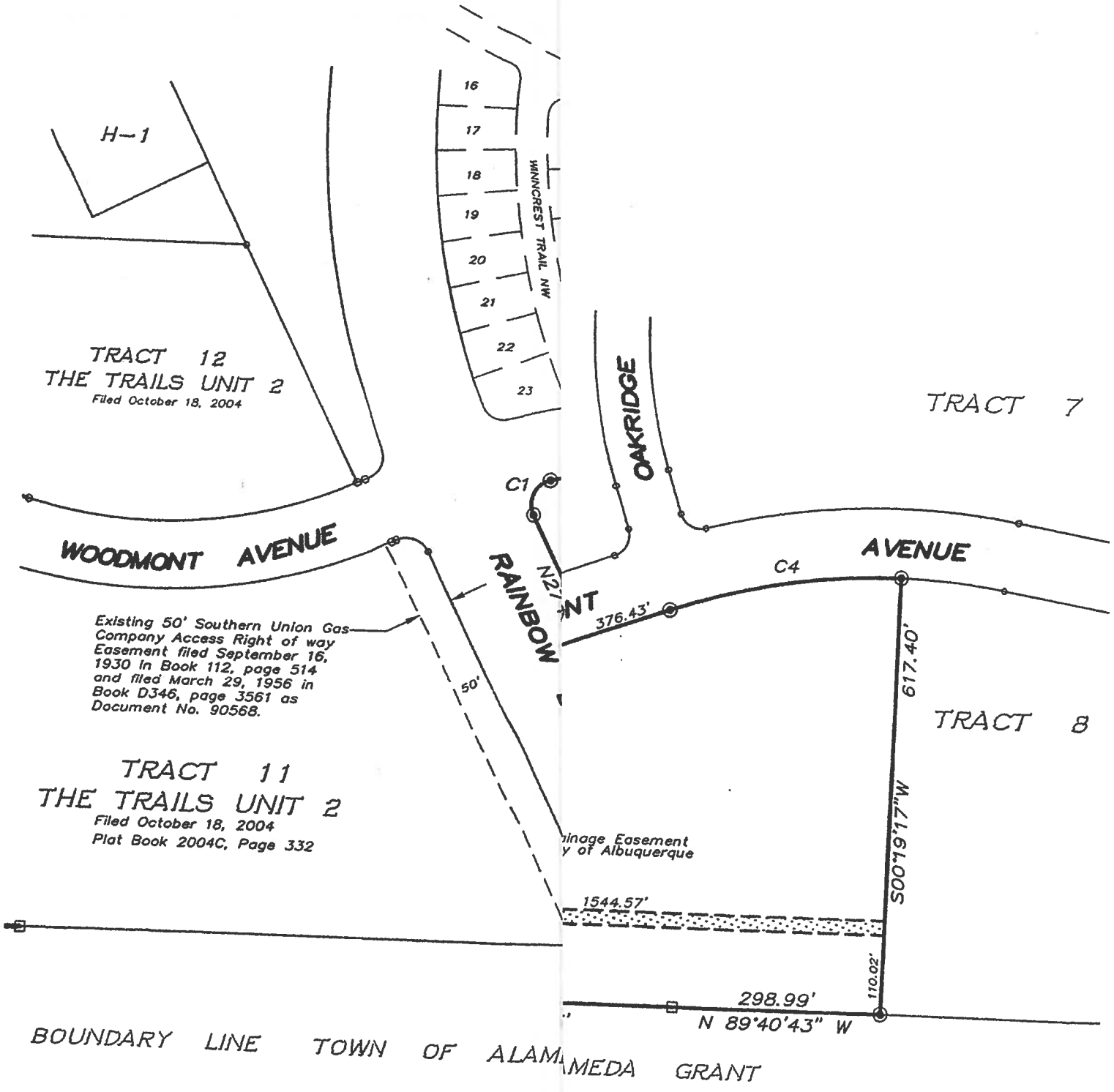
PUBLIC UTILI
common ana

A. PNM E
service
transfo
reasonc

B. PNM G
natural
reasonc

C. QWest
service
facilities
services
closures

D. Comcas


H-1
16
17
18
19
20
21
22
23
WINNCREST TRAIL NW
TRACT 12
THE TRAILS UNIT 2
Filed October 18, 2004
OAKRIDGE
TRACT 7
C1
WOODMONT AVENUE
RAINBOW
C4
AVENUE
376.43'
617.40'
Existing 50' Southern Union Gas Company Access Right of way Easement filed September 16, 1930 in Book 112, page 514 and filed March 29, 1956 in Book D346, page 3561 as Document No. 90568.
50'
TRACT 8
TRACT 11
THE TRAILS UNIT 2
Filed October 18, 2004
Plat Book 2004C, Page 332
S00°19'17"W
1544.57'
110.02'
298.99'
N 89°40'43" W
BOUNDARY LINE TOWN OF ALAMEDA GRANT

CITY OF ALBUQUERQUE

June 13, 2011

Scott J. Steffen, P.E.
Bohannan Huston, Inc.
7500 Jefferson NE
Albuquerque, NM 87109

Re: Tierra Vista Units 1 and 2 at the Trails, south of Woodmont east of Pond H, Grading and Drainage Plan

Engineer's Stamp dated 5-5-11 (C9/D001F)

Dear Mr. Steffen,

Based upon the information provided in your submittal received 5-6-11, the above referenced plan cannot be approved for Preliminary Plat action by the DRB until the following comments are addressed:

- Will Unit 2 be graded at the same time as Unit 1? If so, please state on the grading plan.
- Frrm the as-builts provided; it appears the 54 inch storm drain from Pond H was not connected to the storm drain in Universe Blvd.
- From the grades provided, it appears a retaining wall is required along the entire southern boundary of Unit 1 and Unit 2.
- It appears the exterior property line was omitted from Unit 2.
- Will grading be required east of Unit 2 lots 14 through 23 and 64?
- Should a small pond be built for the bypass of the inlets on the east side of Unit 2?
- Per our discussion on 5-17-11, some rear yards were allowed to drain out the back with a specific detail. Please show on the plan.
- Please include street names on the Grading Plan.
- Comments on the Infrastructure List:
  - Pond K improvements should be added.
  - Add the Note "Certification of the Grading Plan is required for release of Financial Guarantees."

If you have any questions, you can contact me at 924-3986.

Sincerely,

Curtis A. Cherne, P.E.
Principal Engineer, Planning Dept.
Development and Building Services

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

pond design 5-17-11 c̄ Cherene R. Baldonado
S. Stephen

SD is Pond K big enough?
everything drains to K

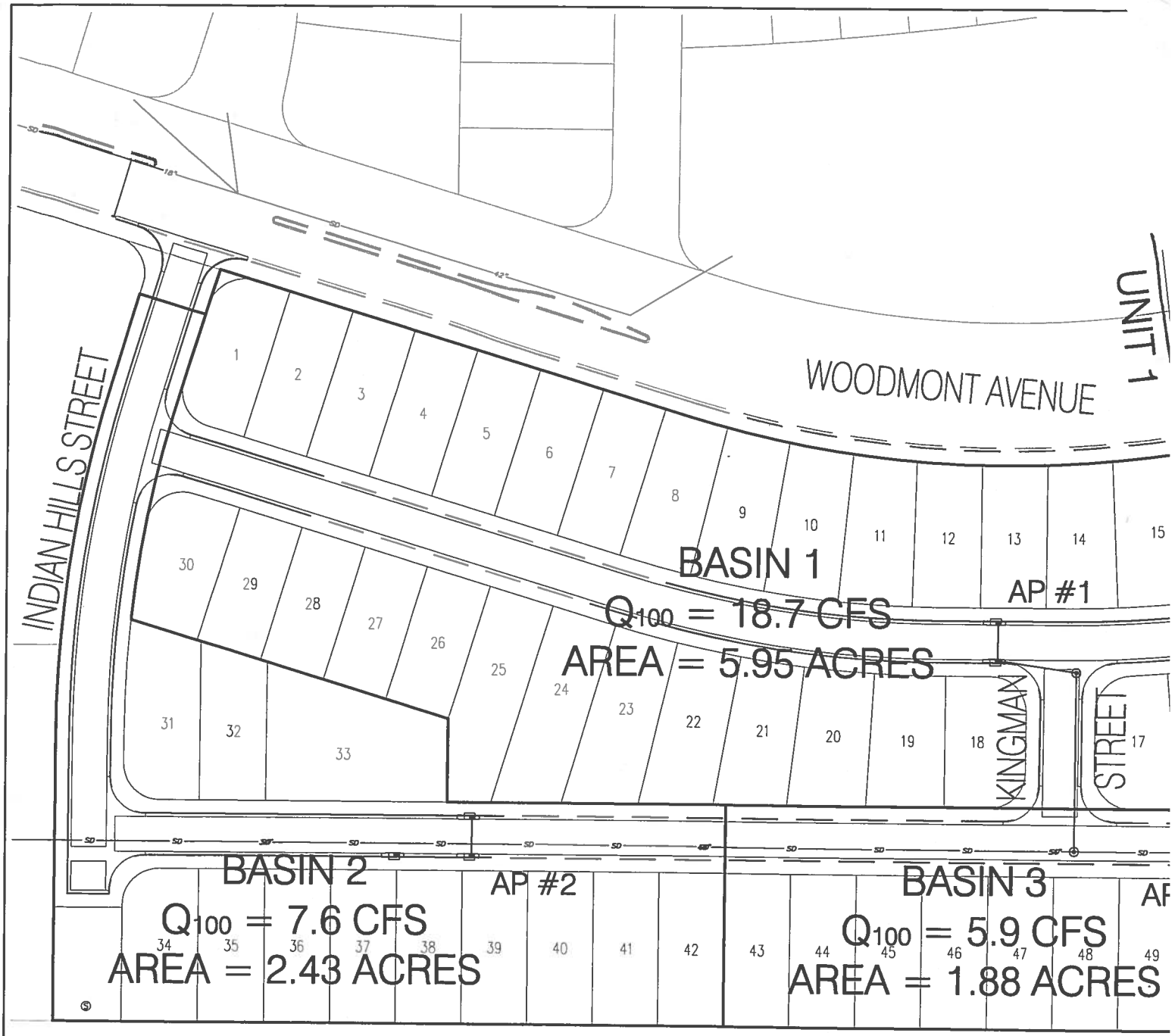
address land treatment in E side pr basin to
determine the size of pond K
is K detention or retention

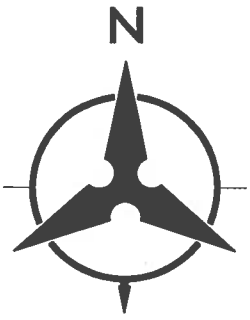
(4 times)
put 28 ac-ft pond on both Taos & Three Creek
Taos SD from Treeline to ~~Pontiac~~ Oakridge

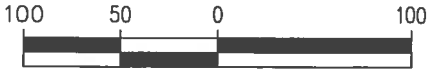
wait for analysis of Pond K when next Valley
Tract come in

OK to drain backyard on dampen to minimize
wall heights

Internal street depths







1" = 100'

TIERRA VIST
BASIN MAP &
JUN

P:\20110369\CDP\Hydro\20110369_BASIN_MAP.dwg
June 22, 2011 - 11:43am

Bohannan ▲ Huston INC.

Courtyard
7500 Jefferson St. N
Albuquerque, N
87109-433

www.bhinc.co

voice: 505.823.100
facsimile: 505.798.798
toll free: 800.877.533

May 6, 2011

Curtis Cherne, P. E.
Planning Department
City of Albuquerque
P. O. Box 1293
Albuquerque, NM 87103

Re: Tract 9A at the Trails Unit 2, DRB 1005031 (C9/D1F)

Dear Curtis:

This letter presents a comparison of the drainage for Tract 9A at the Trails Unit 2 between the previously approved plan prepared by Wilson & Company and a revised analysis for a revised layout. Also attached is a revised grading plan. This submittal is in support of preliminary plat and grading permit approval.

The "Drainage Report for Tract 9A at the Trails Unit II" dated 7/12/06 was prepared by Wilson & Company and approved by the City of Albuquerque on 7/24/06. Since the approval, the layout of the site has been slightly modified with the shifting a various lot lines. The overall lot count of 114 has stayed the same as well as the internal street network. This letter is intended to show that the modification to the site layout does not create any significant increase in runoff from what was approved in the original report. The developed flow drainage patterns remain the same as shown in the approved report.

According to the approved drainage report dated 7/12/06, the total generated runoff for Tract 9A is 50.31 cfs. The Tract 9A runoff was determined based on an area percentage of the overall drainage basin in which it is located in the Trails Unit 2 Drainage Master Plan. Tract 9A is located within Basin L of the Drainage Master Plan. The Basin L flow presented in this report is 78.21 cfs. Tract 9A covers 64.33% of the total Basin L area, resulting in a runoff of 50.31 cfs. The drainage report that the City of Albuquerque has in their files appears to be incomplete, and missing the AYHMO input file for the developed condition. Therefore, Bohannan Huston (BHI) was not able to compare the inputs for Tract 9A.

BHI reviewed the "Drainage Report for Taos at the Trails Unit II" dated 3/21/07, prepared by Wilson & Company and approved by the City of Albuquerque on 4/5/07, which included a sheet for the Trails Unit 2 Drainage Master Plan. Land Treatments presented in the Taos report for Basin L are 19% B, 19% C and 62% D. The runoff generated by Basin L is 83.92 cfs. Apportioning this flow to Tract 9A in the same manner as described above, the Tract 9A runoff is 53.99 cfs.

Using the same Land Treatments used by Wilson & Company in the Drainage Master Plan presented in the Taos report, BHI ran an AHYMO analysis for the revised Tract 9A layout. The runoff for the revised layout is 54.44 cfs.

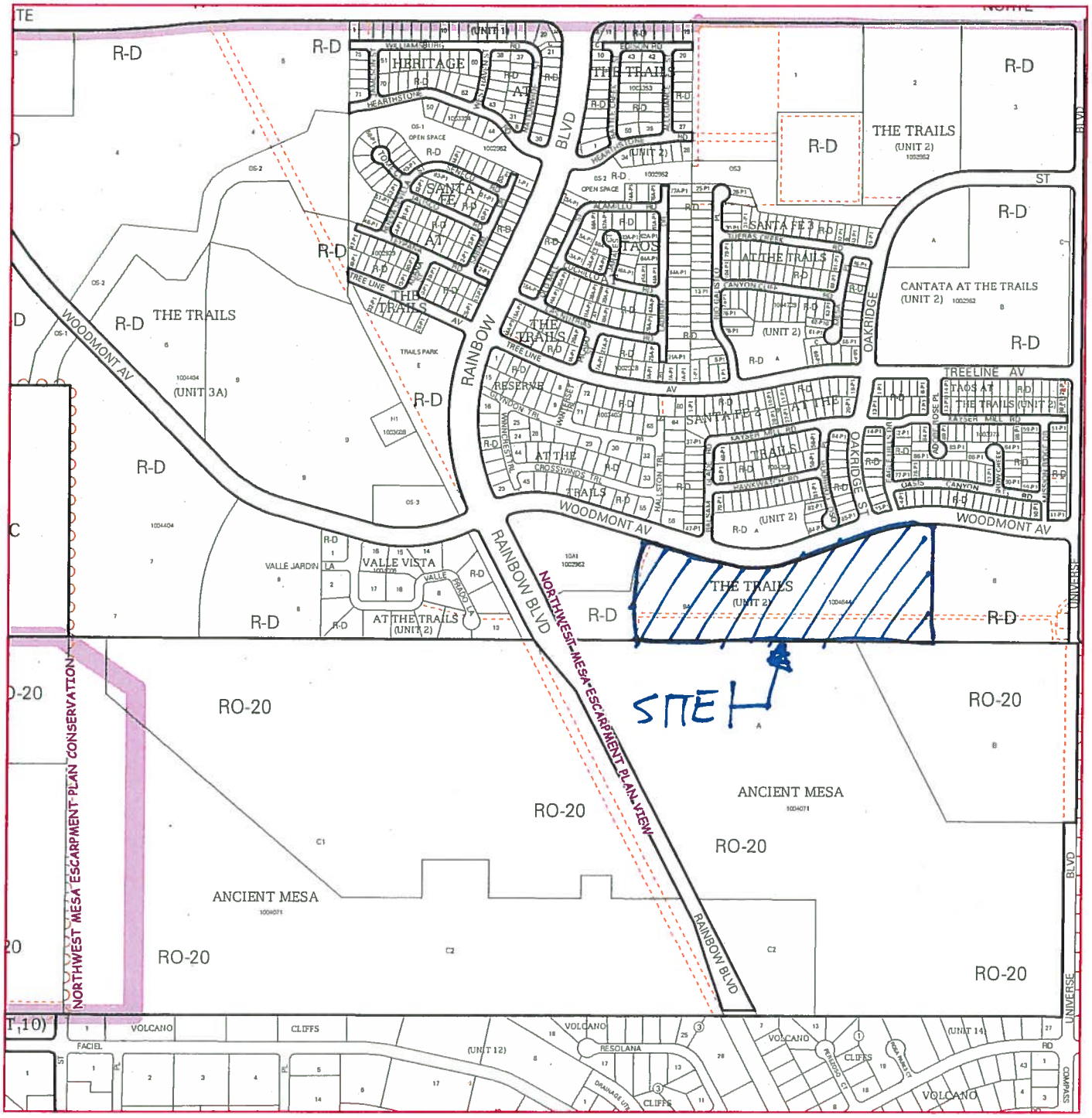
Attached are the BHI AHYMO input and summary output files. Based on our drainage analysis of Tract 9A, the review of previously approved reports, and the fact that the number of lots and layout does not change, it is our option that no significant additional flow results from the change to the layout for Tract 9A.

If you have any questions or require further information, please feel free to contact me.

Sincerely,

Brian Patterson, P.E.
Project Engineer
Community Development and Planning Group

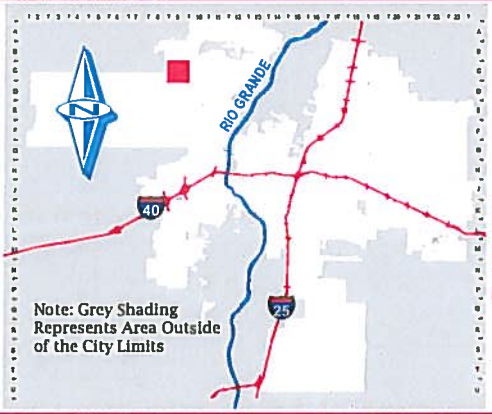
BCP
Enclosures



For more current information and more details visit: http://www.cabq.gov/gis

Albuquerque Geographic Information System

Map amended through: 1/24/2011



Zone Atlas Page:

C-09-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet

Cherne, Curtis

To: Scott Steffen
Subject: Terra Vista

Scott,
Finally cleared my schedule to review Tierra Vista G & D.

1. Unit 1 G & D. Delete Note 8. Good for Preliminary Plat, unless you wish to change.
2. Unit 1 IL. The as-builts call out for a plug in the 54" SD. Therefore, I figure we should add 1 stick of 54" (8') to the IL.

3. Unit 2 G & D. When we talked about a small pond to catch the bypass flows, I figured you had 1 or 2 cfs. 11 is well....quite a bit more than that.
Since the stormwater leaving the street is public, I will need an easement as well as an agreement and covenant. It also seems the pond is too small. I was thinking rather than build a larger pond (approx. 1 ac-ft, 100 yr-10 day, haven't done calcs), you may opt to build a temp D inlet outside of the projected road area to pick up the 11 cfs. If you propose a pond, I will need to see calcs for sizing. Delete Note 8.
4. Unit 2 IL. A) the 54" rcp in Universe (same as for Unit 1)., b) whatever you figure out for the bypass.

Curtis